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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/653,222

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Jin Li

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EXAMINER

NGUYEN, JOSEPH H

ART UNIT

PAPER NUMBER

2815

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/653,222	Applicant(s) LI, JIN	
	Examiner JOSEPH NGUYEN	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 52 and 56-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 52, 56-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 52 and 56-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto (U.S. Publication No. 2004/0080006) in view of Ichikawa et al. (U.S. Patent No. 6,473,144).

Regarding claim 52, Yamamoto discloses an imager device comprising a substrate (301, fig. 3) having a plurality of photosensitive regions (303, fig. 3); and a microlens array (701, fig. 8) formed over the plurality of photosensitive regions, the microlens array comprising a first light conductor (305, fig. 3) having a plurality of concave recesses (fig. 7 and paragraph [0023]) and a second light conductor (311, fig. 9) within each recess and over substantially planar surfaces formed between the concave recesses of the light conductor, wherein a portion of said second light conductor over said planar surface of said first light conductor has a certain thickness. Yamamoto does not disclose this portion of the second light conductor having a thickness approximately equal to $\lambda/2 \cdot N$ as claimed. However, Ichikawa et al. discloses in figure 9 an anti reflection film (26) formed of a high refractive index material, e.g. TiO_2 having a thickness $d1 = \lambda/2 \cdot n1$ wherein λ is the design wavelength (also wavelength that

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enters the anti reflection film 26) and n_1 is the refractive index of the film 26. See column 12, lines 55-61. Further, Ichikawa et al. teaches this anti reflection film is used to prevent crosstalk between pixels and thereby improve the light utilization efficiency (column 12, lines 19-20). It is noted that this anti reflection film 26 is formed of TiO_2 , which is light conducting material. As such, this anti reflection film 26 is also a light conductor. In view of such teaching, it would have been obvious at the time of the present invention to modify Yamamoto by including the portion of the second conductor having a thickness approximately equal $\lambda/2 \cdot N$ so as to prevent crosstalk between pixels and thereby improve the light utilization efficiency. It is noted that the phrase the “portion of the second light conductor reducing crosstalk between adjacent photosensitive regions by spectral reflectance” is merely functional language. The modified imager device by Yamamoto and Ichikawa et al. with a similar structure and material as claimed would comprise the planar surface capable of reducing crosstalk between adjacent photosensitive regions by spectral reflectance herein.

Regarding claim 56, Yamamoto discloses the first light conductor (305) has a first index of refraction (paragraph [0016]) and the second light conductor (311) has a second index of refraction (paragraph [0025]) that is different from the first index of refraction.

Regarding claim 57, Yamamoto discloses the first index of refraction is less than the second index of refraction (paragraph [0025]).

Regarding claim 58, Yamamoto discloses the second light conductor is formed of a polymer (paragraph [0025], lines 8-9).

Regarding claim 59, Yamamoto discloses in paragraph [0014], lines 1-3 a color filter (207, fig. 2) is placed between the microlens (205) and the light sensitive element (photosensitive element). Since the microlens comprises the first light conductor, this color filter is placed below the first light conductor.

3. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto and Ichikawa et al. and further in view of Hook et al. (U.S. Patent No. 5,898,196).

Regarding claim 60, Yamamoto discloses in figure 3 the photosensitive regions (303). Yamamoto nevertheless does not disclose the photosensitive region having a p⁺ type region formed over an n-type region. However, Hook et al. discloses in figure 2a the photosensitive (p⁺/n- regions on the left hand side of the device) having a p⁺ type region formed over an n- type region. In view of such teaching, it would have been obvious at the time of the present invention to further modify Yamamoto and Ichikawa et al. by including the photosensitive region having a p⁺ region formed over an n- region so as to form a photosensitive (photosensor) in an imager device.

4. Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto and Ichikawa et al. and further in view of Kochi et al. (U.S. Patent No. 6,188,094).

Regarding claim 61, Yamamoto and Ichikawa et al. disclose substantially all the structures set forth in claim 61 except for a shielding layer formed below the first light conductor. However, Sochi et al. discloses in figure 1 an imager device comprising a shielding layer (105) below the first light conductor (108). In view of such teaching, it would have been obvious at the time of the present invention to further modify Yamamoto and Ichikawa et al. by including a shielding layer formed below the first light conductor so as to strictly focus lights into the photosensitive regions in a desired manner.

5. Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto and Ichikawa et al. and further in view of Lee et al. (U.S. Publication No. 2002/0162943).

Regarding claim 62, Yamamoto and Ichikawa et al. disclose substantially all the structures set forth in claim 62 except for at least one microlens in the array having a focal point being off center in relation to an underlying respective photosensitive region. However, Lee et al. discloses in figure 4 an imager device comprising at least one microlens (410) in the array (410, 412, 414, 416) having a focal point being off center in relation an underlying respective photosensitive region (420) so as to focus radiation to the selected photosensitive region (detector). See paragraph [0034]. In view of such teaching, it would have been obvious at the time of the present invention to further modify Yamamoto and Ichikawa et al. by including at least one microlens in the array

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having a focal point being off center in relation to an underlying respective photosensitive region so as to focus radiation to the selected photosensitive region.

Response to Arguments

6. Applicant's arguments filed on 04/15/2009 have been fully considered but they are not persuasive.

With respect to claim 52, applicant argues Ichikawa does not teach an anti-reflection film having a thickness equal to " $\lambda/2 * N$ " as recited in claim 52. However, Ichikawa teaches the anti-reflection layer 26 comprises a thin film of a high refractive material TiO_2 having an optical thin film thickness $d1 = \lambda/2 * n1$, and this high refractive thin film is construed as "claimed second light conductor". Also, only the thickness $d1$ is employed to modify Yamamoto because Yamamoto already discloses a second light conductor 311 as shown in figure 9. Thus, the resulting structure would not include Ichikawa's anti reflection film formed on the entirety of Yamamoto's second light conductor as asserted by applicant. Further, the Office Action is not engaging in impermissible hindsight using applicant's disclosure as a guide to arrive at the claimed invention, but rather using Ichikawa's teaching of the benefit of utilizing a hologram element 5 whose surface the anti-reflection film 26 is provided on so as to prevent crosstalk between pixels B and G (col. 11, lines 20-30). As such, Ichikawa cures the deficiency between Yamamoto and claim 52 and provides a strong motivation to combine Yamamoto and Ichikawa. Moreover, a display device as well known in the art may comprise an image sensor, and a display device and an image sensor both include

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pixels and filters in their structures as well. Lastly, Yamamoto teaches in paragraph [0014] the present invention is meant to encompass a color filter 207 having any color. In other words, Yamamoto teaches the color filter 207 can allow different narrow bands of light to pass therethrough.

For all of the reasons above, the rejection of claim 52 is deemed to be proper and thus the rejection of claims 56-62 still stands accordingly.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 8:30 am- 5:00 pm. If

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attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/J. N./

Examiner, Art Unit 2815

/Kenneth A Parker/

Supervisory Patent Examiner, Art Unit 2815